

- 1 -

## SEQUENCE LISTING

<110> Cade, Rebecca M  
Dietrich, Robert A

<120> GENES ENCODING PROTEINS INVOLVED IN THE REGULATION OF  
SAR GENE EXPRESSION IN PLANTS

<130> A-31089A

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<150> 60/171,008

<151> 1999-12-15

<150> 60/175,519

<151> 2000-01-11

<160> 23

<170> PatentIn Ver. 2.1

<210> 1

<211> 509

<212> DNA

<213> Arabidopsis thaliana

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<222> (68)..(433)

<223> gene product NI16

<220>

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<222> (142)..(147)

<223> SalI site

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<223> EcoRI site

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aaaatcagca aataaacttt tcttgactaa gcttaaacga cgccgttaac attttcttct 60  
ggctaac atg aac aac tct ttg aag aaa gaa gaa cgc gta gaa gaa gat 109  
Met Asn Asn Ser Leu Lys Lys Glu Glu Arg Val Glu Glu Asp  
1 5 10  
aac gga aaa tct gac ggt aac aga ggg aaa ccg tcg acg gaa gtt gtt 157  
Asn Gly Lys Ser Asp Gly Asn Arg Gly Lys Pro Ser Thr Glu Val Val  
15 20 25 30

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cgg acg gta acg gag gaa gag gtg gat gag ttt ttc aag ata tta cgg 205  
 Arg Thr Val Thr Glu Glu Glu Val Asp Glu Phe Phe Lys Ile Leu Arg  
                   35                  40                  45

aga gta cac gtg gcg aca cga acg gtt gcg aaa gtt aac ggc ggt gtt 253  
 Arg Val His Val Ala Thr Arg Thr Val Ala Lys Val Asn Gly Gly Val  
                   50                  55                  60

gct gag gga gag tta ccg tct aag aag agg aaa cgg agt cag aat ctt 301  
 Ala Glu Gly Glu Leu Pro Ser Lys Lys Arg Lys Arg Ser Gln Asn Leu  
                   65                  70                  75

ggg ttg aga aac tcg ttg gat tgt aac ggc gtt cga gac gga gaa ttc 349  
 Gly Leu Arg Asn Ser Leu Asp Cys Asn Gly Val Arg Asp Gly Glu Phe  
                   80                  85                  90

gat gag att aat cgg gtc ggg tta cag ggt ttg ggt ttg gat ctg aac 397  
 Asp Glu Ile Asn Arg Val Gly Leu Gln Gly Leu Gly Leu Asp Leu Asn  
                   95                  100                  105                  110

tgt aaa ccg gaa cca gac agc gtt agt tta tcg ttg tagacttgta 443  
 Cys Lys Pro Glu Pro Asp Ser Val Ser Leu Ser Leu  
                   115                  120

gtccttcacg tttttcccct tcttacaata atcaattttt ttttaactac aatacttttg 503

aaaaaa 509

<210> 2

<211> 122

<212> PRT

<213> Arabidopsis thaliana

<400> 2

Met Asn Asn Ser Leu Lys Lys Glu Glu Arg Val Glu Glu Asp Asn Gly  
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Lys Ser Asp Gly Asn Arg Gly Lys Pro Ser Thr Glu Val Val Arg Thr  
                   20                  25                  30

Val Thr Glu Glu Glu Val Asp Glu Phe Phe Lys Ile Leu Arg Arg Val  
                   35                  40                  45

His Val Ala Thr Arg Thr Val Ala Lys Val Asn Gly Gly Val Ala Glu  
                   50                  55                  60

Gly Glu Leu Pro Ser Lys Lys Arg Lys Arg Ser Gln Asn Leu Gly Leu  
                   65                  70                  75                  80

Arg Asn Ser Leu Asp Cys Asn Gly Val Arg Asp Gly Glu Phe Asp Glu  
                   85                  90                  95

Ile Asn Arg Val Gly Leu Gln Gly Leu Gly Leu Asp Leu Asn Cys Lys

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100

105

110

Pro Glu Pro Asp Ser Val Ser Leu Ser Leu  
 115 120

<210> 3  
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 <222> (365)..(374)  
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 <222> (609)..(614)  
 <223> MYCATR22 element

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 <222> (646)..(665)  
 <223> CAMV AS1 salicylic acid response element

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 <222> (707)..(712)  
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 <222> (757)..(762)  
 <223> HEXAMERAT 4 element

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 <222> (863)..(1228)  
 <223> NI16 genomic coding region

<400> 3  
 tgggttttta ttggataaca tgacaaatat ttatttattt catgagtttt tattggatag 60  
 catgacaaat attaatatat cagtgttaat aacatgtttt gttcttaaaa tacatgcatt 120  
 ttaaaatcag acatttgttt taaaatcaaa tctaattctt tatatcacia cgacattgac 180  
 ggaaaattca ggtaaaaaga gaaaataaag aatgagagat agagagattt ctatggaaaa 240  
 agaaagagag aacatgtagg tgaacaaaat aaagagatat gatgatatat tttatgagag 300  
 gtggtgaaga ttatttttagg agagggagag agaaatagaa aaagaaaatg acatggtgaa 360

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tctgaagaag atgaattgtg ttaaagatga agagagaaaag agaactccat ggctaaagtc 420
tcgtaaagaa gatgaaaaag aaacaaaaga aggaagaaga aagagaaagg ctaaaataga 480
ctaactattg ccaaaatttc tgtagccgac aaatactatt tggccaagg ttattttgtg 540
tattcttttg aagtcaaaag ttattttctta catatactct aaaaatatag ccgataccaa 600
tttttccaca catggacttc ctttattcca aaagtcaata aagtgtgacg tcatgatact 660
tacgctttta aacatcgcat gatgatgtca ttagcatcaa tctccaccgt ccaattttatt 720
tagttgttga caatatcgac cgtctaagtt ccacaccgac ggctataaga gtttcattat 780
aaatttttagc aaaataaaat cagcaaataa ttttttcttg actaagctta aacgacgccg 840
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agataacgga aaatctgacg gtaacagagg gaaaccgtcg acggaagttg ttcggacggg 960
aacggaggaa gaggtggatg agtttttcaa gatattacgg agagtacacg tggcgacacg 1020
aacggttgcg aaagttaacg gcggtgttgc tgagggagag ttaccgtcta agaagaggaa 1080
acggagtcag aatcttgggt tgagaaaactc gttggattgt aacggcgcttc gagacggaga 1140
attcgatgag attaatcggg tcgggttaca ggggttgggt ttggatctga actgtaaacc 1200
ggaaccagac agcgttagtt tatcgttgta gactttagt cttcatgtt tttccccttc 1260
ttacaataat caattttttt ttaactacaa tacttttgaa aaaaatggta aaagaagatt 1320
attaacatgt tatccaaatt tcagattctt cagttttatt ttatacgtca aaagagaagt 1380
tatatatttg caaaactaca agtcaaacaa aagctattta agcgtttgac gttcctaaac 1440
aacataaatt ttactaaaat caatgtttta aaaaagtgtt gatggtaaag atatcaattg 1500
ggcctttgcc tggcccgttt agtaatatg cagagtaggt atgggcctgt ataagggagt 1560
ccaaaaaaag agcgggcatt gcgggttggg tgcgtttgga actttggatt gtggattagt 1620
catggtttat ctattaatgt ctgcggactt gtggacgacg cgcttgttct tcttcctctg 1680
tttacgactt acgaacatat                                     1700

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&lt;210&gt; 4

&lt;211&gt; 608

&lt;212&gt; DNA

&lt;213&gt; Solanum tuberosum

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (124)..(438)

&lt;400&gt; 4

caggtaatac acacagaaaa cattgacata acagatcgaa tacacattat attatattaa 60

tgagagaata aagagaagta attgcactag cagtattgac aattaatcag ctagccggct 120

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tga atg cta ctt atg gac gga gaa aag aag agg aag aga aca gca atc 168
Met Leu Leu Met Asp Gly Glu Lys Lys Arg Lys Arg Thr Ala Ile
1 5 10 15

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ggc gcc gga gat cgg agt aag gat gag gta gaa gct act gtg aag gag 216
Gly Ala Gly Asp Arg Ser Lys Asp Glu Val Glu Ala Thr Val Lys Glu
20 25 30

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gag gag ccg ccg tca gag gcg gag gtt gac gag ttc ttc gcg atc tta 264
Glu Glu Pro Ser Glu Ala Glu Val Asp Glu Phe Phe Ala Ile Leu
35 40 45

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cgg agg atg cat gtg gcg gtg aaa tat ctc cag aga aat gct cag att 312
Arg Arg Met His Val Ala Val Lys Tyr Leu Gln Arg Asn Ala Gln Ile
50 55 60

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- 5 -

cgg ccg gaa aac ctt aac gca tcg ccg gcc ggt gct aac ggt gtc gca 360  
 Arg Pro Glu Asn Leu Asn Ala Ser Pro Ala Gly Ala Asn Gly Val Ala  
           65                              70                              75

gct gga cgg aag aga gaa cgg gga atc gtg aga aaa ggt gat ttg gac 408  
 Ala Gly Arg Lys Arg Glu Arg Gly Ile Val Arg Lys Gly Asp Leu Asp  
           80                              85                              90                              95

ctc aac act ctg ccg gac ggc gga gac taa ttaacgcagt ttaagcatag 458  
 Leu Asn Thr Leu Pro Asp Gly Gly Asp  
                               100                              105

gttaattaca taaatgcacc cttaattatc gtagattctt aagattgatc tgctgtacag 518

attaattaat taaagccttt ttttatatat atttctccgg taaacgggtt gctctttgtg 578

attttcttta ataaatttaa tttattttat 608

<210> 5

<211> 104

<212> PRT

<213> Solanum tuberosum

<400> 5

Met Leu Leu Met Asp Gly Glu Lys Lys Arg Lys Arg Thr Ala Ile Gly  
   1                              5                              10                              15  
 Ala Gly Asp Arg Ser Lys Asp Glu Val Glu Ala Thr Val Lys Glu Glu  
                               20                              25                              30  
 Glu Pro Pro Ser Glu Ala Glu Val Asp Glu Phe Phe Ala Ile Leu Arg  
                               35                              40                              45  
 Arg Met His Val Ala Val Lys Tyr Leu Gln Arg Asn Ala Gln Ile Arg  
                               50                              55                              60  
 Pro Glu Asn Leu Asn Ala Ser Pro Ala Gly Ala Asn Gly Val Ala Ala  
                               65                              70                              75                              80  
 Gly Arg Lys Arg Glu Arg Gly Ile Val Arg Lys Gly Asp Leu Asp Leu  
                               85                              90                              95  
 Asn Thr Leu Pro Asp Gly Gly Asp  
                               100

<210> 6

<211> 349

<212> DNA

<213> Lycopersicon esculentum

<220>

<221> CDS

<222> (3) .. (233)

<400> 6

ct tcg gag gga gag gtg gat gag ttt ttc gca att tta cgg agg atg 47

- 6 -

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      Ser Glu Gly Glu Val Asp Glu Phe Phe Ala Ile Leu Arg Arg Met
      1              5              10              15
cac atg gcc gta aaa tat ctt cag aga aac gct cag att cag ccg gaa   95
His Met Ala Val Lys Tyr Leu Gln Arg Asn Ala Gln Ile Gln Pro Glu
              20              25              30
aac gtt aac gct cac ggc agc aag tta acc gca tcg ccg gcc ggt gtt   143
Asn Val Asn Ala His Gly Ser Lys Leu Thr Ala Ser Pro Ala Gly Val
              35              40              45
aac gga gat gca act gga cag aag aga gaa cgg gga atc gtg aga aaa   191
Asn Gly Asp Ala Thr Gly Gln Lys Arg Glu Arg Gly Ile Val Arg Lys
              50              55              60
ggt gat ttg gac ctc aac act ttg ccg gac tgc gga gac taa           233
Gly Asp Leu Asp Leu Asn Thr Leu Pro Asp Cys Gly Asp
              65              70              75
cgcagtttaa gcataggtta attacagaaa tgcaccttta attatcgtag attcttaaga 293
ttgatctgct gtacaaatta attaaatgaa gccttttttt atatataaaa aaaaaa   349

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<210> 7  
 <211> 76  
 <212> PRT  
 <213> Lycopersicon esculentum

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<400> 7
Ser Glu Gly Glu Val Asp Glu Phe Phe Ala Ile Leu Arg Arg Met His
 1              5              10              15
Met Ala Val Lys Tyr Leu Gln Arg Asn Ala Gln Ile Gln Pro Glu Asn
      20              25              30
Val Asn Ala His Gly Ser Lys Leu Thr Ala Ser Pro Ala Gly Val Asn
      35              40              45
Gly Asp Ala Thr Gly Gln Lys Arg Glu Arg Gly Ile Val Arg Lys Gly
      50              55              60
Asp Leu Asp Leu Asn Thr Leu Pro Asp Cys Gly Asp
      65              70              75

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<210> 8  
 <211> 75  
 <212> PRT  
 <213> Glycine max

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<400> 8
Met Glu Val Glu Lys Arg Lys Asn Lys Arg Val Met Gly Glu Glu Glu
 1              5              10              15
Glu Ser Glu Arg Val Lys Asn Lys Arg Leu Lys Gly Val Glu Glu Glu
      20              25              30

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- 7 -

Asp Gly Ser Asp Gly Val Pro Thr Glu Glu Glu Val Glu Glu Phe Phe  
35 40 45

Ala Ile Leu Arg Arg Met Arg Met Ala Val Lys Tyr Phe Asp Asp Lys  
50 55 60

Gly Arg Gly Gly Arg Glu Trp Arg Glu Ala Leu  
65 70 75

<210> 9

$\langle 211 \rangle$  90

<212> PRT

<213> Glycine max

<400> 9

Gly Gly Val Pro Thr Glu Glu Glu Val Glu Glu Phe Phe Ala Ile Leu  
1 5 10 15

Arg Arg Met Arg Val Ala Val Lys Tyr Phe Asp Asp Lys Gly Ser Gly  
20 25 30

Gly Lys Glu Trp Arg Lys Ala Leu Glu Thr Ala Glu Leu Thr Val Asp  
35 40 45

His Arg His Asp Val Val Ala Ala Glu Glu Asp Asp Lys Pro Arg Lys  
50 55 60

Lys Gly Gly Glu Val Ile Ile Asn Glu Gly Phe Asp Leu Asn Ala Val  
65 70 75 80

Ala Pro Glu Ala Ala Glu Gly Gly Gly Ala  
85 90

$\langle 210 \rangle$  10

<211> 85

<212> PRT

<213> Nicotiana tabacum

<400> 10

Met Asp Gly Glu Lys Lys Arg Lys Arg Thr Glu Asn Gly Lys Ala Asn  
1 5 10 15

Gly Gly Asp Arg Asn Arg His Glu Arg Lys Ser Ala Ala Asn Glu His  
20 25 30

Thr Ala Val Ser Pro Pro Pro Ser Glu Ala Glu Val Asp Glu Phe Phe  
35 40 45

Ala Ile Leu Arg Arg Met His Val Ala Val Arg Tyr Leu Gln Glu Ser  
50 55 60

- 8 -

Gly Gln Lys Arg Val Val Pro Lys Gly Asp Leu Asp Leu Asn Thr Leu  
65 70 75 80

Pro Gly Asn Gly Asp  
85

<210> 11  
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<212> DNA  
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<223> Description of Artificial Sequence: Primer NIM5'RI

<400> 11  
ggaacgaatt catggacacc accattg 27

<210> 12  
<211> 26  
<212> DNA  
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NIM3'SalI

<400> 12  
aaaaaagtcg actaagagca agagtc 26

<210> 13  
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<212> DNA  
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NIMtrunc3'NcoI

<400> 13  
cgatctccat ggcagcttgt cc 22

<210> 14  
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NIMloop5'RI



<400> 14  
gaaccgaatt catgatcgca 20

<210> 15  
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<400> 15  
ttccggttta cagttcagat 20

<210> 16  
<211> 22  
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<220>  
<223> Description of Artificial Sequence: Primer GSP2

<400> 16  
gacccgatta ataatctcat cg 22

<210> 17  
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<223> Description of Artificial Sequence: Primer GSP3

<400> 17  
caccatttct gggttgaggt 20

<210> 18  
<211> 20  
<212> DNA  
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<223> Description of Artificial Sequence: Primer 16F

<400> 18  
acgacgccgt taacattttc 20

<210> 19  
<211> 21

<212> DNA  
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer 16R

<400> 19  
gaaggggaaa aacatgaagg a

21

<210> 20  
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NI16-DegF

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<222> (1)..(26)  
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cggaggngga ggtngaygag ttyttc

26

<210> 21  
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<220>

<223> Description of Artificial Sequence: PCR primer  
NI16-DegR

<220>  
<221> misc\_feature  
<222> (1)..(27)  
<223> n = a, t, c, or g

<400> 21  
gaaraactcr tcnacctcnn ccctccg

27

<210> 22  
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<212> DNA  
<213> Arabidopsis thaliana

<220>

<221> CDS  
<222> (1)..(336)

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&lt;400&gt; 22

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| atg gac aga gac aga aag agg gtg aaa atg gag aag gaa gat gac gaa | 48 |
| Met Asp Arg Asp Arg Lys Arg Val Lys Met Glu Lys Glu Asp Asp Glu |    |
| 1 5 10 15   |    |

|   |    |
|---|----|
| gaa gaa aag atg gag aag ttg tac aca gtg ctt aaa aac gca agg gaa | 96 |
| Glu Glu Lys Met Glu Lys Leu Tyr Thr Val Leu Lys Asn Ala Arg Glu |    |
| 20 25 30  |    |

|   |     |
|---|-----|
| atg cgg aaa tat gtc aac agc tcc atg gag aag aag aga cag gaa gaa | 144 |
| Met Arg Lys Tyr Val Asn Ser Ser Met Glu Lys Lys Arg Gln Glu Glu |     |
| 35 40 45  |     |

|   |     |
|---|-----|
| gaa gaa aga gca agg gtt cgt aga ttc cct tcg ttt cag cca gaa gat | 192 |
| Glu Glu Arg Ala Arg Val Arg Arg Phe Pro Ser Phe Gln Pro Glu Asp |     |
| 50 55 60  |     |

|   |     |
|---|-----|
| ttc att ttc atg aat aaa gca gag gcc aac aac att gaa aaa gca gct | 240 |
| Phe Ile Phe Met Asn Lys Ala Glu Ala Asn Asn Ile Glu Lys Ala Ala |     |
| 65 70 75 80   |     |

|   |     |
|---|-----|
| aat gag agc tct tca gca tcc aac gag tat gat ggc tct aag gaa aag | 288 |
| Asn Glu Ser Ser Ser Ala Ser Asn Glu Tyr Asp Gly Ser Lys Glu Lys |     |
| 85 90 95  |     |

|   |     |
|---|-----|
| caa gaa gga tct gag act aac gtt tgt tta gac ttg aat ctt tct ctg | 336 |
| Gln Glu Gly Ser Glu Thr Asn Val Cys Leu Asp Leu Asn Leu Ser Leu |     |
| 100 105 110   |     |

|   |     |
|---|-----|
| tagcatacat acatacaaga gacaaagagc tcttcagttt ctgtataagc aacaaagaat | 396 |
|---|-----|

|                      |     |
|----------------------|-----|
| gtagtagtaact acgtacc | 413 |
|----------------------|-----|

&lt;210&gt; 23

&lt;211&gt; 112

&lt;212&gt; PRT

&lt;213&gt; Arabidopsis thaliana

&lt;400&gt; 23

|   |
|---|
| Met Asp Arg Asp Arg Lys Arg Val Lys Met Glu Lys Glu Asp Asp Glu |
| 1 5 10 15   |

|   |
|---|
| Glu Glu Lys Met Glu Lys Leu Tyr Thr Val Leu Lys Asn Ala Arg Glu |
| 20 25 30  |

|   |
|---|
| Met Arg Lys Tyr Val Asn Ser Ser Met Glu Lys Lys Arg Gln Glu Glu |
| 35 40 45  |

|   |
|---|
| Glu Glu Arg Ala Arg Val Arg Arg Phe Pro Ser Phe Gln Pro Glu Asp |
| 50 55 60  |

- 12 -

Phe Ile Phe Met Asn Lys Ala Glu Ala Asn Asn Ile Glu Lys Ala Ala  
65 70 75 80

Asn Glu Ser Ser Ser Ala Ser Asn Glu Tyr Asp Gly Ser Lys Glu Lys  
85 90 95

Gln Glu Gly Ser Glu Thr Asn Val Cys Leu Asp Leu Asn Leu Ser Leu  
100 105 110

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